NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

	-			-	
	SOIL AND RO	OCK LEGEND, TERMS,	SYMBOLS, AND ABE	BREVIATIONS	
SOIL DESCRIPTION	GRADATION			ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL DESCRIPTION SOIL DESCRIPTION CHADATION CHADATIO		E SAME SIZES, (ALSO MORE SIZES.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, MOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEYEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PERETRATION BY A SPLIT SPOON SAMPLER EDUAL TO OR LESS THAN 2.5 cm PER 38 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.		ALLUVIUM (ALLUV) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. ADUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
LUNGSISERUT, CUCLUR TEATURE, THIS SUPERING CHARGE PRESIDENT FOR THE THE UNITS SOUTH AS MINERALOGICAL COMPOSITION, ANGUL ARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE YEAR STRY, GRAY SUP CIN, MOST WITH MITCHEODED FINE SHID LIPES, MICH. PLAST, LAT-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY TH SUBANGULAR, SUBROUNDED, OR ROUNDED.	HE TERMS ANGULAR.		ED AS FOLOWS: COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS 38 cm.	ARGULACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MIMERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - CROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION CENERAL GRANLAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERAL DGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		CRYSTALLINE FINE WOUL	TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT D YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,	AT WHICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
CLASS. (195% PASSING *200) (196% PASSING *200) GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-e A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3 A-6, A-7	COMPRESSIBILITY		ION-CRYSTALLINE FINE SEDIM	SSCHOOLS SCHOOLETE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN MENTARY ROCK THAT WOULD YELD SPT REFUSAL IF TESTED, ROCK TYPE JOES PHYLLITE, SLATE, SANDSTONE, ETC.	CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 8000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LIQUID LIMI HIGHLY COMPRESSIBLE LIQUID LIMI	T 31-58 C T GREATER THAN 50 S	DASTAL PLAIN COAST	Tal Plain Sediments cemented into rock, but may not yield Nefusal. Rock type includes limestone, sandstone, cemented . Beds, etc.	CORE RECOVERY IREC. TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RLM AND EXPRESSED AS A PERCENTAGE.
PASSING SILT- MUK				WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
* 48 S8 MXD8 MXD1 MX 15 MX35 MX35 MX35 MX35 MX36 MX36 MX36 MX36 MX36 MX36 MX36 MX36	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TI	RACE 1 - 18% ITTLE 18 - 282	HAMMER IF CRYSTALLINE.	CHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
DUED LIMIT 48 MX 41 MN 48 MX41 MN 50ILS WITH ASTIC MOREX 6 MX N.P. 18 MX18 MX18 MX11 MN 18 MX 18 MX11 MN 11 MN 50ILS WITH LITTLE OR HIGH	MODERATELY ORGANIC 5=-18% 12 - 28% SI HIGHLY ORGANIC >16% >28% HI	OME 28 - 35%		INTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, ECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF	<u>DIP DIRECTION DIP AZIMUTHS -</u> THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
SULL TYPES STORE FRACE. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER		SLL) 2.5 cm. OPEN JOINTS MAY	ints stained and discoloration extends into rock up to contain clay, in granitoid rocks some occasional felospar iscolored, crystalline rocks ring under hammer blows,	FALLT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
ATERIALS SMO SAND BRAVEL HAD SHAD SUILS SUILS EN RATING	STATIC WATER LEVEL AFTER 24 HOURS. VPV PERCHED WATER SATURATED ZONE OR WATER BEA	1 2	(ODERATE SIGNIFICANT PORTIONS OF F MOD.) GRANITOID ROCKS, MOST FEL	ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS, IN DSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGED FROM PARENT MATERIAL.
AS A EXCELLENT TO GOOD FAIR TO POOR POOR POOR UNSUIT SUBGRADE P.I. OF A-7-5 ≤ L.L 30 1P.I. OF A-7-6 > L.L 30	O-IN- SPRING OR SEEPAGE		WITH FRESH ROCK.	BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS PRIMARY SOIL TYPE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	MISCELLANEOUS SYMBOL ROADWAY EMBANKMENT WITH SOIL DESCRIPTION MISCELLANEOUS SYMBOL SPT DRT DRT TEST BOR	.S s	EVERE AND DISCOLORED AND A MAJ	JORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH IH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK,	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
GENERALLY VERY LOOSE 44	WITH SOIL DESCRIPTION STATE TO SOIL SYMBOL AUGER BORING	DESIGNATIONS S	EVERE ALL ROCKS EXCEPT QUARTZ SEV.) IN STRENGTH TO STRONG SC	Discolored or Stained, rock fabric clear and Evident But Reducei Dil In Granitoid Rocks all Feldspars are Kaolinized to some	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS DCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
CRANALAR	ARTIFICIAL FILL OTHER THAN CORE BORING	SS- SPLIT SPOON	IF TESTED, YIELDS SPT N Y	of strong rock usually remain, <u>Nalues > 180 Blons per 30 cm</u> , Discolored or stained, rock fabric elements are discernible but	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN
VERY DENSE >58 VERY SOFT <2 (8.25 GENERALLY SOFT 2 TO 4 8.25 TO 9.5	INFERRED SOIL BOUNDARIES MONITORING M	CAMDI E	REMAINING. SAPROLITE IS A	REDUCED TO SOIL STATUS, WITH ONLY FRACHENTS OF STRONG ROCK N EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINDR ROCK FABRIC REMAIN. IF IESTER YELDS SY'L WILLDS (FIRE DEGREE FRACE)	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 TO 8 6.5 TO 1	TTTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY	RT- RECOMPACTED CO	SCATTERED CONCENTRATIONS	CK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND L QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK, ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
HARO >36 >4	25/825 DIP/DIP DIRECTION OF SLOPE INDICATION INSTALLATION ROCK STRUCTURES	CBR - CBR SAMPLE	ALSO AN EXAMPLE.	ROCK HARDNESS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE S. STD. SIEVE SIZE 4 19 48 58 286 278	● - SOUNDING ROD ÆET — SPT N-VALUE		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REDUIRES SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK,		SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
PENING 04M0 4.76 2.8 9.42 9.25 9.975 8.953 BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY SAND SAND SILT CLAY	ABBREVIATIONS AR - AUGER REFUSAL NM - NOT ME	ACUBER	TO DETACH HAND SPECIMEN	-	SILL - AN INTRISIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTERT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS
TRLDR.) (COB.) (GR.) (CSE. SD.) (F. SD.) (SL.) (CL.) GRAIN MM 305 75 2.0 0.25 0.05 0.006	BT - BORING TERMINATED PMT - PRESSUREMETER TEST CL CLAY SD SAND, SANDY		MODERATELY CAN BE SCRATCHED BY KNIFF OR PICK. GOUGES OR GROOVES TO 6 mm DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.		SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
SIZE IN. 12" 3" CPT - COME PENETRATION TEST SL SILT, SILTY CSS COARSE SL SILTY SOIL MOISTURE - CORRELATION OF TERMS DMT - DILATOMETER TEST TCR - TRICONE REFUSAL			ED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. ALL CHIPS TO PEICES 25 mm MAXIMUM SIZE BY MARD BLOWS OF THE ICK.	STANDARD PENETRATION TEST OFENETRATION RESISTANCES (SPT) - NUMBER OF BLOWS (NO OF A 63.5 kg) HAMMER FALLING 8.76 METERS REDUIRED TO PRODUCE A PENETRATION OF 38 on INTO SOIL WITH A 5 on OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 2.5 om PENETRATION	
(ATTERBERG LIMITS) DESCRIPTION			SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL. THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 25 mm SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY		WITH 58 BLDVS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
LL LIQUID LIMIT (SAT.) FROM BELOW THE GROUND WATER TABLE					STRATA ROCK QUALITY DESIGNATION (S.R.O.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
ASTIC SEMISOLID: REQUIRES DRYING TO ATTAIN OPTIMEM MOISTURE	EQUIPMENT USED ON SUBJECT	PROJECT	FINGERNAIL. FRACTURE SPACING	BEDDING	TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS:	HAMMER TYPE:	IERM SPACING	TERM THICKNESS	BENCH MARK: TBM 6: Spike in 350 mm Oak Tree
OM OPTIMUM MOISTURE - MOIST - DM SOLIDI AT OR NEAR OPTIMUM MOISTUR	E X MOBILE B- 57 CLAY BITS	X AUTOMATIC X MANUAL	VERY WIDE MORE THAN 3 : WIDE 1 TO 3 m MODERATELY CLOSE 38 TO 188 cm	THICKLY BEDDED 8.5 - 1 m THINLY BEDDED 8.95 - 8.5 m	STA. 39+82.873 -L-, 229.185m RT ELEVATION: 254.139m
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	IS2 mm CONTINUOUS FLIGHT AUGER	CORE SIZE:	CLOSE 5 TO 38 cm VERY CLOSE LESS THAN 5 cm	VERY THINLY BEDDED 18 - 56 mm THICKLY LAMINATED 2.5 - 18 mm THINLY LAMINATED < 2.5 mm	NOTES:
PLASTICITY	X CNE-85 HARD FACED FINGER BITS	m_m		INDURATION	
PLASTICITY INDEX (PD) ORY STRENGTH	TUNG-CARBIDE INSERTS]. •	OR SEDIMENTARY ROCKS, INDURATION IS T	HE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
ONPLASTIC 8-5 YERY LOW OW PLASTICITY 6-15 SLIGHT	CME-57 X CASING W/ ADVANCER	X -H 0	FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
ED, PLASTICITY 16-25 MEDIUM IGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 74.6 mm STEEL TEETH	HAND TOOLS: POST HOLE DIGGER	MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBES	
COLOR	TRICONE	HAND AUGER		BREAKS EASILY WHEN HIT WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY)	X CORE BIT	SOUNDING ROD	INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE: DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X OTHER CHE-858 X OTHER FISHTAIL	VANE SHEAR TEST OTHER	EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE: SAMPLE BREAKS ACROSS GRAINS.	
				OFFI IN WILEWAY MENUSCO UNITEDA	DOUGED, DOUG AND